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THE NOMENCLATURE OF THE AMERICAN FISHES USUALLY CALLED LEUCISCUS AND RUTILUS.

BY T. D. A. COCKERELL.

The structure of the scales in European *Leuciscus* and *Rutilus* is so different from that of the American fishes assigned to these genera, that the latter must evidently be separated. It will be useful, for the sake of comparison, to briefly describe the characters of the scales of the principal European groups:

(1) *Leuciscus* Cuvier.

L. leuciscus (L.). Scale rather broad; latero-basal angles strong; lateral circuli extremely numerous; apical circuli about half as many; basal radii well developed; apical radii about five, very strong, with several incomplete (peripheral) ones between; nuclear area a short distance basad of middle, with no granular patch. (Gefle, Sweden; *Wheelwright;* B. Mus.)

(2) *Rutilus* Raf.

L. rutilus (L.). Scale very large, diameter about 12 mm.; latero-basal angles strong; lateral circuli extremely numerous; *apical circuli not different from lateral;* basal radii strong, but few; apical radii about five, speading, very strong, with intermediate ones suggested by obscured grooving and marginal crenulation; nuclear area central, circulate nearly to middle. (Salisbury, England; *Ogden Smith;* B. Mus.)

(3) *Pigus* Bp.

L. pigus. Scale much as in *L. rutilus*, but not so large; nuclear area basad of middle, apical grooves and crenulations very distinct. This undoubtedly falls in the same group as *L. rutilus*. (Lombardy; B. Mus.)

(4) *Cephalus* Bp. (= *Squalius* Bp.?)

L. cephalus (L.). Scale like *L. leuciscus*, but (at least in specimens examined) larger. *Nuclear area conspicuously apicad of middle;* almost no marginal rudiments of apical radii; apical circuli not

so strongly differentiated from lateral ones. The basal radii are numerous and close together. (Gotha River, Sweden; *Lloyd;* B. Mus.)

(5) *Idus* Heck.

L. idus (L.). Scale of same general type as *L. leuciscus*, with the same strong differentiation between lateral and apical circuli. (Munio River, Lapland; B. Mus.)

(6) *Scardinius* Bp.

S. erythrophthalmus (L.). Scale as in *L. pigus*, but even fewer apical radii (four, widely spreading). Apical circuli same as lateral. (River Cam, Newport; *F. Templeman;* B. Mus.)

(7) *Phoxinus* Raf.

P. phoxinus (L.). Scale minute, broad, with radii all around; of same type as those of *Chrosomus* and *Tiaroga*. (Merioneth; B. Mus.)

The following is from North Africa:

(8) *Phoxinellus* Heck.

P. chaignoni (Vaillant) = *callensis* according to B. Mus. label. Scale minute, broad, slightly triangular; circuli few; nuclear area subbasal; apical radii about ten, spreading; *no basal radii:* lateral circuli about 18 to 20. (Oued el Mahd; and Oued Abdallah, Tunis; Paris Mus.; B. Mus.) These scales are extremely distinct from those of all the groups given above; the resemblance to those of *Phoxinus* is merely superficial.

The Japanese *L. jouyi* and *L. hakuensis* are not closely related to (or, apparently, even congeneric with) any of the above groups. They show a strong approach to the American types.

The American fishes, so far as known to me, may be arranged as follows:

RICHARDSONIUS Girard. (*Leuciscus* Auctt. Amer.)

For table of species, see Proc. Biol. Soc. Wash., XXII, p. 159.

(1) Subgenus *Temeculina* nov.

Scales of elongate type, with basal radii.

Richardsonius orcutti (Eigenm. & Eigenm.).

(2) Subgenus *Tiogoma* Girard.

Richardsonius pulchellus (Baird and Girard); syn. *Leuciscus nigrescens* (Girard).

Richardsonius pulchellus pandora (Cope). The northern subspecies. I recently examined specimens of this form from San Luis Lake, Costilla Co., Colorado (*E. R. Warren*), and was surprised to find the peritoneum black, and the pharyngeal teeth obtuse, scarcely hooked. The intestine contained seeds. *R. pulchellus* is a curiously variable species, such as one might imagine to arise from the intermingling and hybridization of several species originally distinct.

Richardsonius intermedius (Girard).

Richardsonius alicix (Jouy). Atypical for this subgenus.

(3) Subgenus *Clinostomus* Girard.

Richardsonius elongatus (Kirtland). Small, broad scales.

(4) Subgenus *Richardsonius* s. str.

Richardsonius balteatus (Rich.) Girard.
Richardsonius thermophilus Evermann & Cockerell.

(5) Subgenus *Cheonda* Girard.

Richardsonius egregius (Girard).
Richardsonius hydrophlox (Cope).
Richardsonius carletoni (Kendall).
These three are not very closely related, and are placed here provisionally, especially as I have not seen *Richardsonius cooperi* (Girard), the type of *Cheonda*.

(6) Subgenus *Margariscus* nov.

Type *margarita*. The so-called American *Phoxinus*, but wholly diverse from true *Phoxinus*. A small-scaled group.
Richardsonius margarita (Cope).
Richardsonius neogæus (Cope).

(7) Subgenus *Hemitremia* Cope.

Richardsonius vittatus (Cope); syn. *Leuciscus flammeus* (Jordan & Gilbert). This I have not seen.

Iotichthys Jordan & Evermann.

Iotichthys phlegethontis (Cope). Scales not seen.

Siphateles Cope. (*Rutilus* subg. *Leucos* Auctt. Amer.)

Siphateles olivaceus (Cope). Scales very small, with few radii.

Myloleucus Cope. (*Rutilus* Auctt. Amer.)

Myloleucus thalassinus Cope.
Myloleucus symmetricus (Baird & Girard). A composite species.
Myloleucus columbianus (Snyder).
Myloleucus oregonensis (Snyder).
Myloleucus bicolor (Girard).
Myloleucus boucardi (Günther). Not seen.

The group *Siboma* Girard, I have not seen.